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KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER

KEYS, ROSALYND ANN

ART UNIT PAPER NUMBER

1621

DATE MAILED: 03/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/642,952

Applicant(s)

SHOJI ET AL.

Examiner

Rosalynd Keys

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 1-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Status of Claims

1. Claims 1-34 are pending.
Claims 13-34 are rejected.
Claims 1-12 are withdrawn from consideration.

Election/Restrictions

2. Newly submitted claim 1 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the original claims were directed to a method of producing dimethyl ether comprising dehydrating methanol in the vapor phase in the presence of an activated alumina catalyst having the claimed sodium oxide content and average pore radius. Amended claim 1 now includes an additional method step of removing sodium oxide from a starting material or an activated alumina or from the activated alumina after being shaped, to obtain an activated alumina catalyst having the claimed sodium oxide content and average pore radius.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 1-12 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

The invention of claims 1-12 is considered to be distinct from the invention as originally claimed because the original invention did not require removal of sodium oxide from the catalyst prior to its use in the dehydration of methanol to produce dimethyl ether. The invention simply required that dimethyl ether be produced by dehydration of methanol in the presence of a catalyst having the claimed sodium oxide content. The removal of sodium oxide from the

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catalyst and then using said catalyst in the production of dimethyl ether is a completely different invention from using a catalyst having a particular sodium oxide content.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 21 and 24-34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 21 and 32 include the limitation a pore volume of 0.45 mL/g or less, however, the specification does not support having a pore volume of less than 0.125 mL/g (see specification page 11, lines 3-11). Claims 24-34 include the limitation producing dimethyl ether at a conversion ratio of methanol to dimethyl ether. This is considered new matter because the specification defined conversion ratio as, "Conversion ratio (%) = (1-(the amount of unreacted methanol / the amount of methanol fed)) x 100." Thus a conversion ratio of methanol to dimethyl ether is new matter.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 24-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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The instant claims are considered to be indefinite because it is not clear if the phrase "a conversion ratio of methanol to dimethyl ether" means a conversion ratio of methanol to produce dimethyl ether or a conversion ratio of methanol to dimethyl ether, i.e., methanol/dimethyl ether.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 13-21 and 24-31 are rejected under 35 U.S.C. 102(b) as anticipated by Imata et al. (JP 03-056433, English Translation pages 1-11).

Imata et al. teach production of dimethyl ether by dehydration of methanol in the presence of a γ -alumina catalyst (see pages 2-11 of English translation). The average pore radius ranges from 50 to 100 angstroms, which is equivalent to 5 to 10 nm, with the preferred average pore radius being from 50 to 85 angstroms, which is equivalent to 5 to 8.5 nm (see page 6). The pore volume is taught to be in the range of from .60 to 0.90 mL/g (see page 6). The dehydration pressure is disclosed as being from 1-20 kg/sq.cm, preferably 5-15 kg/sq.cm, which is equivalent to 0.098-1.96 MPa, preferably 0.49-1.47 MPa (see page 6). The catalyst is not disclosed as containing sodium oxide.

9. Claims 13-17, 19-28 and 30-34 are rejected under 35 U.S.C. 102(b) as anticipated by Brake (US 4,595,785).

Brake teaches preparation of dimethyl ether by dehydration of methanol in the presence of a catalyst comprising γ -alumina and titania (see entire disclosure, in particular column 1, line

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49 to column 2, line 65). The pore size is disclosed as being greater than 25 angstrom units, which is equivalent to 2.5 nm (see column 2, lines 6-11). The upper limit of the pore size is 16 nm based upon using the upper pore volume of 0.8 cc/g and the lower limit of the surface area of 100 m²/g (data derived from the formula given on page 6 of applicants specification for determining the average pore radius). If the lower limit of the pore volume equates with the lower limit of the surface area and upper limit of the pore volume with the upper limit of the surface area, then the average pore radius would range from 4 to 6.4 nm, which is well within the applicants claimed 2.5 - 8 nm. The dehydration pressure is disclosed as preferably ranging from 1034-1723 kPa (gauge), which is equivalent to 1.034 MPa to 1.723MPa (see column 1, lines 60-65).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

12. Claims 13-20, 22-31, 33 and 34 are rejected under 35 U.S.C. 103(a) as obvious over Imata et al. (JP 03-056433, English Translation pages 1-11).

Imata et al. disclose the invention as described above. Imata et al. differ from claims 22, 23, 33 and 34 because Imata et al. teach using an average pore radius of from 5-10 nm, whereas the instant claims require the average pore radius to be at least 2.5 nm and less than 5.0 nm.

However, Imata et al. teach that a pore radius of less than 30 nm can be utilized (see page 5). Thus, although Imata et al. expressly disclose the average pore radius to be from 5 to 10 nm, there is a suggestion that this radius can be modified. Particularly since Imata et al. teach that control of the physical properties of the γ -alumina catalyst is directly related to the long-term stability of the catalytic activity (see page 5). One of the physical properties disclosed as being related to the long-term stability and activity of the catalyst is the average pore radius (see page 5). Thus, Imata et al. gives the ordinary skilled artisan motivation to modify the average pore radius. Further, the instant invention is considered to be obvious over the average pore radius of 5-10 nm, preferably 5-8.5 nm, as disclosed by Imata et al. because generally, differences in concentration will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The comparative data presented in the instant invention is not sufficient to avoid this rejection because the comparison is not being made with the closest prior art. For example, none of the comparative data examples given by the Applicants utilize an average pore radius of 5-5.5 nm and a sodium oxide content of zero as disclosed and/or exemplified by Imata et al. Further, the average pore radius was taught by Imata et al. to be a result effective variable.

Response to Amendment

13. The declaration under 37 CFR 1.132 filed December 20, 2004 is insufficient to overcome the rejection of claims 22, 23, 33 and 34 based upon a rejection of original claim 1 under 35 USC 103(a) as unpatentable over Imata et al. (JP 03-056433) as set forth in the last Office

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action because: the comparison is not being made with the closest prior art, i.e., an average pore radius of 5-5.5 nm and a sodium oxide content of zero as disclosed and/or exemplified by Imata et al. Further, the Applicants have not demonstrated that their results are unexpected. Especially, since Imata et al. disclose the average pore radius to be a result effective variable.

Response to Arguments

Imata et al.

14. Applicant's arguments filed December 20, 2004 have been fully considered but they are not persuasive.

The Applicants argue that one having ordinary skill in the art would not infer that Imata et al. (formerly referred to as Masasane et al.) does not contain sodium oxide simply because Imata et al. is silent about the sodium oxide content. The Applicants seem to infer that the Examiner's citation of Murai et al. was to show that γ -alumina catalysts inherently have a sodium oxide content of 0.08%. The Examiner disagrees. To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). In the instant case there is no teaching in Imata et al. of sodium oxide being present in their γ -alumina catalyst. Thus, the Examiner concluded that this meant that the Imata et al. catalyst did not contain sodium oxide, absent evidence to the contrary. The Examiner did cite Murai et al. which discloses a γ -alumina catalyst that contains 0.08% sodium oxide, however this reference was cited to show the state of the art and not to infer that γ -alumina catalysts inherently contain

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0.08% sodium oxide. In fact, Brake, which is used in a rejection of the claims, discloses a γ -alumina catalyst which contains 0.1-20% by weight of titania and 80-99.9% by weight of γ -alumina, preferably 0.2-10% of titania and 90-99.5% of alumina, even more preferably about 1% of titania to about 99% of alumina. No mention of the presence of sodium oxide is made. Thus, based upon the teaching of Brake, a γ -alumina catalyst does not inherently contain 0.08% sodium oxide and in fact does not have to contain any sodium oxide.

The Applicants argue that Imata et al. do not teach or even suggest a step of removing sodium oxide from γ -alumina catalyst. Imata et al. clearly fail to recognize the relationship between the sodium oxide content and the conversions ratio when the average pore radius falls within a specific range (2.5 nm to 8.0 nm). There is no implicit suggestion in Imata et al. to reduce the sodium oxide content to 0.07% or less when the average pore radius is 2.5 nm to 8.0 nm in order to increase the conversion ratio. No prior art teaches or suggests importance of the sodium oxide content in activated alumina when catalyzing the vapor phase converting reaction of methanol. This argument is not persuasive. First of all the instant claims do not include a step of removing sodium oxide from γ -alumina catalyst. Therefore, this argument is irrelevant. With regard to the arguments about the importance of sodium oxide in the Imata et al. reference, these arguments are also irrelevant, since Imata et al. do not teach that sodium oxide is present in their γ -alumina catalyst.

The declaration submitted by Applicant with regard to the sodium oxide content being critical is insufficient with regard to the Imata et al. reference because it is not a comparison to the teachings of Imata et al. Although the average pore radius of comparative example 1 is within the range taught by Imata et al., the sodium oxide content is not. Imata et al. do not teach that sodium oxide is present in their γ -alumina catalyst, whereas the comparative example 1, shown on page 6 of Applicant's remarks, contains a sodium oxide content of 0.25%. Further,

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in the examples disclosed in the Imata et al. reference the lowest methanol conversion rate is 72.3%, whereas in the comparative example 1, the conversion rate is only 41%.

The Applicants argument with regard to the thickness and temperature of the catalyst of Imata et al. are not persuasive. The Applicants have submitted that is the claimed average pore radius and sodium oxide content are the limitations which produce the unexpected results. Thus, for a proper side-by-side comparison to Imata et al. the Applicants should have compared the average pore radius and sodium oxide content taught by Imata et al. to those of the instant invention. The Applicants have not done this, thus the Applicants have not overcome the Examiner's prima case of obviousness.

For the above reasons, claims 13-20, 22-31, 33 and 34 are rejected under 35 U.S.C. 103(a) as obvious over Imata et al. (JP 03-056433, English Translation pages 1-11).

Brake

15. The rejection of the claims under 35 USC 103(a) is being withdrawn in favor of the rejection under 35 USC 102(b). Thus, the Applicants arguments with regard to Brake under 35 USC 103(a) are moot.

The Applicants have not made any arguments with regard to the rejection of the claims under 35 USC 102(b). Thus, this rejection would have been maintained if claims 1-4 6 and 7 were not withdrawn from consideration.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**


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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosalyn Keys whose telephone number is 571-272-0639. The examiner can normally be reached on M and F 3:00-8:00 pm and T-Th 5:30-10:30 am.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on 571-272-0646. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Rosalyn Keys
Primary Examiner
Art Unit 1621

March 1, 2005